



USB-Isolator

USER'S MANUAL



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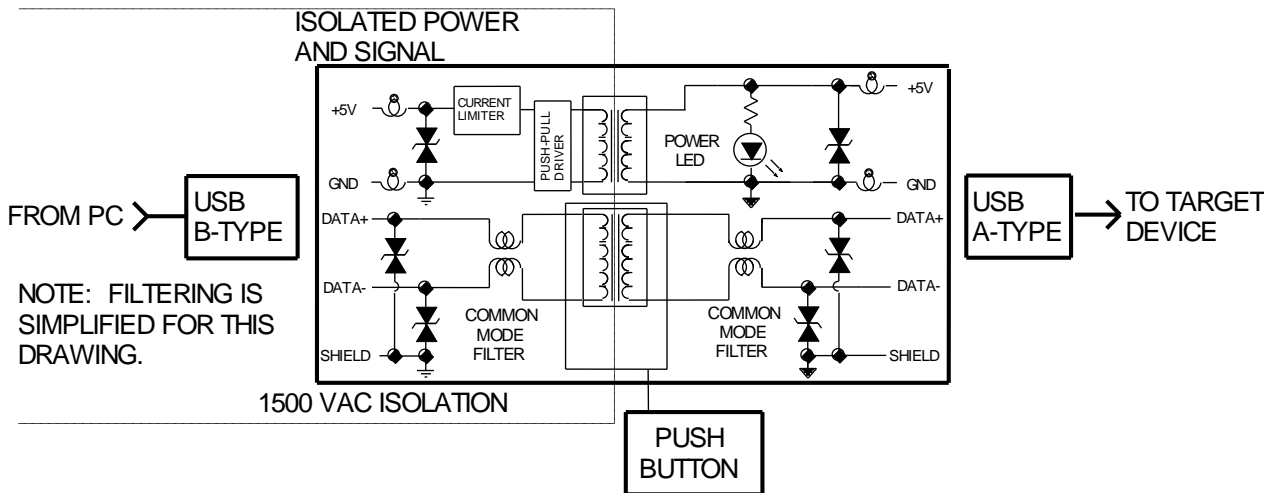
OVERVIEW

Key Features

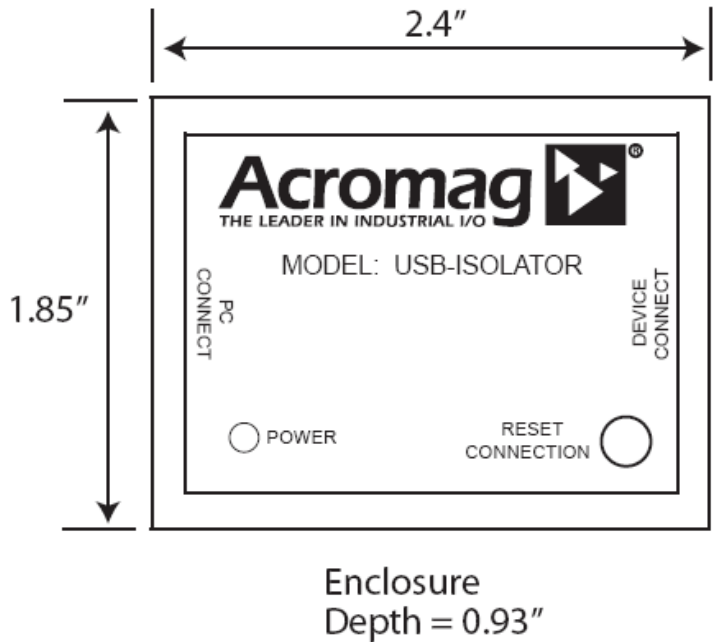
- **Fully Isolated** power and I/O circuits for safety and increased noise immunity.
- **CE and FCC Compliant.** Designed to meet and exceed EN61000 specifications.
- **UL Listed (USA & Canada).** Suitable for use in Class I, Division 2, Groups A, B, C, D Hazardous Locations, or Nonhazardous Locations only.
- **High retention USB connectors** provide minimum withdrawal force of 15 Newtons.
- **USB bus powered** and no need for external power.
- **USB Cable Included,** 1 meter USB cable (Type A to Type B).
- **USB 2.0 compatible.**
- **Changeable Data Rate** allows selectable full-speed 12Mbps (*Default*), or low-speed 1.5Mbps.
- **Wide Ambient Operation** from -40° to 70°C (-40° to +158°F).
- **Hardened For Harsh Environments** and includes protection from RFI, EMI, ESD, EFT, & surges. Has low radiated emissions per CE requirements.
- **Power LED** provides power indication and overload indication.
- **Reset Push Button** is a useful feature for reinitializing peripherals without unplugging cables.
- **Built in Current Limiting with Auto Retry** prevents damage to isolator and connected USB devices.
- **Small, compact and rugged housing design.**
- **Easy to install** with existing equipment.
- **No special drivers required.**

This circuit isolates USB power and data via two transformers. Input power is current limited to 200mA to help prevent damage to connected devices (corresponding to ~137mA out load). Both signal lines are equipped with common-mode filters and include transient protection. USB is set to full speed (12 Mbps), but can be jumped to low speed (1.5 Mbps) for legacy device support.

HOW IT WORKS



USB-ISOLATOR SIMPLIFIED SCHEMATIC



DIMENSIONS

Symbols on equipment:



Means "Refer to User's Manual (this manual) for additional information".

Installation

Guide to Quickly Establishing Communication

Note: This device is not intended to isolate hubs.

Note: This isolator will break the path to earth ground. Most personal computers connect the USB signal ground in common with the cable shield and earth ground. The PC connector side of this isolator also holds signal ground in common with the connector shield. The target device connector side of this isolator does not transfer the earth ground connection across the barrier that was made at the PC side. If the device that you are isolating must be earth grounded, other provisions must be implemented to introduce earth ground to the isolated side.

WARNING – EXPLOSION HAZARD – Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous.

WARNING – EXPLOSION HAZARD – Substitution of any components may impair suitability for Class I, Division 2.

WARNING – EXPLOSION HAZARD – The area must be known to be non-hazardous before servicing/replacing the unit and before installing.

- 1) Connect B-type plug (square connector) to 'PC connect' side of the USB Isolator.



- 2) Connect A-type plug of USB cable to an available USB port on the computer (the power LED will turn on when connected to a powered computer).



- 3) Connect the A-type plug (flat connector) to the 'device connect' side of the isolator. Connect the other side of the cable to the peripheral being isolated. **NOTE:** This device is not intended to isolate the trunk of a USB hub, as its output current is limited to ~137mA.



- 4) Your computer should prompt that a new device has been connected to the computer. The power LED of the isolator should be ON and not blinking. At this point, you are ready to begin talking to your connected device.

TIP: If your PC fails to detect your USB device, try pushing the reset connection button on the Isolator.

This is an optional procedure to change the data rate of the full-speed USB-ISOLATOR to low speed.

In order to change the speed, it requires that the board be carefully removed from the enclosure and this requires handling at an ESD-safe work station.



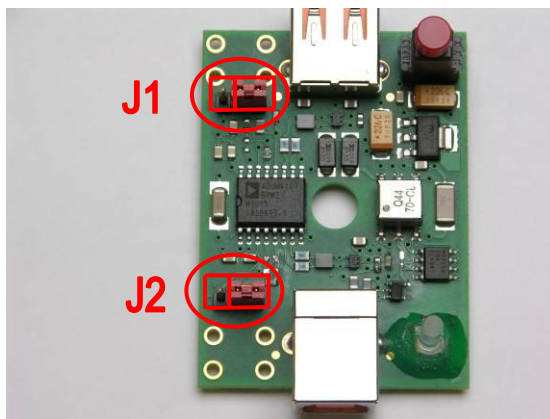
Warning: We do not recommend that you do this in the field, as it invites potential damage to sensitive internal circuitry.

- 1) Open enclosure by unscrewing Phillips head screw on bottom of the case (a label sticker will have to be pulled up to access this screw).



- 2) *To Switch to Low Speed (1.5Mbps):* Remove jumpers J1 and J2 and replace as shown below (right-most position).

Note: If both jumpers are not set the same way the unit will not function properly



Installation

Changing USB Speed

Note: Default speed is set to full-speed (12Mbps)

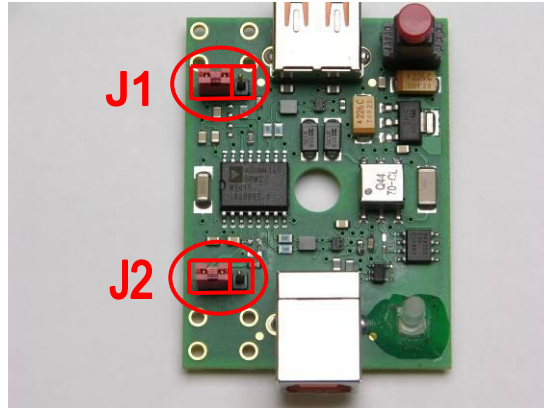
Installation

Changing USB Speed

This is an optional procedure to change the data rate of the USB-ISOLATOR to high speed.

- 1) *To Switch to High Speed (12Mbps):* Remove jumpers J1 and J2 and replace as shown below (left most position).

Note: If both jumpers are not set the same the unit will not function properly



- 2) Carefully place board back into enclosure and mate both sides of enclosure. Install the screw in the bottom of enclosure. The isolator is now ready for operation.

Troubleshooting

POSSIBLE CAUSE	POSSIBLE FIX
<i>The power LED does not light up when plugged into USB port...</i>	
No power on the USB port or USB port is bad.	Try plugging the unit into another USB port.
USB A-B cable is bad.	Replace cable.
<i>Cannot communicate with device connected through the Isolator...</i>	
Your computer does not support the peripheral .	
Your device does not support 12Mbps.	Try changing internal jumpers to low speed (see page 5).
You do not have the speed set identically for each side.	Verify internal jumpers are BOTH set to the same speed.
<i>The LED is ON and the peripheral is powered but the computer will not prompt me to indicate the device is connected...</i>	
Loose connection.	Check both cable connections, make sure they are properly and securely fitted into the USB connection ports at both ends.
The PC could not recognize the device.	Press the 'reset connection' button on the USB isolator. If this does not work, try replugging the cable.
<i>I plug in my device but the power LED is blinking and the computer will not prompt me that a device is connected...</i>	
Peripheral is drawing too much current for the isolator.	The USB isolator will not provide more than 120mA to peripheral, Unplug peripheral and plug it directly into PC (this is not isolated).

Case Material: Plastic non-conductive. UL-94 HB flammability rating.

Dimensions: 2.40" Length x 1.85" Wide x 0.925" High
(60.96mmx46.99mmx23.495mm)

Cable Length: Maximum cable length is 5 meters on each side.

Connectors: High retention USB Type A (x 1) and USB Type B (x 1) connectors with minimum withdrawal force of 15 Newton's

Data Rate: Selectable full-speed 12Mbps (*Default*) or low-speed 1.5Mbps.

Transient Protection: Transient Voltage Suppressors are applied at both the PC and target device ports. The metal cable shield is connected to signal GND through a ferrite.

Power LED - Constant ON if power is on and unit is OK. Blinking ON/OFF indicates unit is in current limit mode (>137mA) and the connected device is drawing too much power.

Safety Approvals: UL Listed (USA & Canada) suitable for use in Class I, Division 2, Groups A, B, C, D Hazardous Locations, or Nonhazardous Locations only.

Electromagnetic Compatibility (EMC): CE marked, per EMC Directive 2004/108/EC.

Immunity per BS EN 61000-6-1:

- 1) Electrostatic Discharge Immunity (ESD), per IEC 61000-4-2.
- 2) Radiated Field Immunity (RFI), per IEC 61000-4-3.
- 3) Electrical Fast Transient Immunity (EFT), per IEC 61000-4-4.
- 4) Surge Immunity, per IEC 61000-4-5.
- 5) Conducted RF Immunity (CRFI), per IEC 61000-4-6.

Emissions per BS EN 61000-6-3:

- 1) Enclosure Port, per CISPR 16.
- 2) Low Voltage AC Mains Port, per CISPR 14, 16.
- 3) DC Power Port, per CISPR 16.
- 4) Telecom / Network Port, per CISPR 22.

Note: This is a Class B product.

Reliability Prediction

MTBF (Mean Time Between Failure): MTBF in hours using MIL-HDBK-217F, FN2. *Per MIL-HDBK-217, Ground Benign, Controlled, G_BG_C*

Temperature	USB-ISOLATOR
25°C	1,899,812 hrs
40°C	1,638,160 hrs

Power Supply: Standard 5VDC power provided from the USB host computer up to 120mA of current.

Current Limit: Isolator is equipped with a 200mA input limiter to isolator and this corresponds to ~137mA out. Once limit is reached, power will open and retry momentarily, repeatedly until the current draw is less than 200mA.

Isolation: USB power and data circuits are isolated from each other for common-mode voltages up to 250VAC, or 354V DC off DC power ground, on a continuous basis (will withstand 1500VAC dielectric strength test for one minute without breakdown). Complies with test requirements of ANSI/ISA-82.01-1988 for voltage rating specified.

Operating Temp: -40°C to +70°C (-40°F to +149°F).

Relative Humidity: 5 to 95%, non-condensing.

SPECIFICATIONS

Enclosure and Physical

USB Interface

Controls and Indicators

Agency Approvals

EMC – CE Marked

Environmental